

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. *(Previously Presented)* A solid-state image pickup device comprising:

first and second insulating films formed on a surface of a semiconductor substrate, said second insulating film being formed thicker than said first insulating film;

a solid-state image pickup region having only said first insulating film provided thereon and having, as a charge transfer electrode, an electrically conductive material film formed on said first insulating film, and

a peripheral circuit region formed on said semiconductor substrate other than in said solid-state image pickup region, said peripheral circuit region having said first and second insulating films provided thereon, and further, an isolating electrode, formed of said conductive material film and on said second insulating film, for isolation of devices included in said peripheral circuit region.

2. *(Original)* The solid-state image pickup device according to claim 1, wherein a gate electrode constituting a transistor in said peripheral circuit region is formed on the first insulating film in said peripheral circuit region, and said gate electrode is formed in the same step as that of said isolating electrode.

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. APPLN. NO. 09/855,652
ATTORNEY DOCKET NO. Q64500

3-4. (*Cancelled*).

5. (*Original*) The solid-state image pickup device according to claim 1, wherein said first and second insulating films are formed of the same material film.

6. (*Previously Presented*) The solid-state image pickup device according to claim 1, wherein a third insulating film is formed thinner than said first insulating film on the surface of said semiconductor substrate in said peripheral circuit region in addition to said first and second insulating films, and

wherein a gate electrode constituting a transistor in said peripheral circuit region is formed on the third insulating film in said peripheral circuit region, and said gate electrode is formed in the same step as that of said isolating electrode.

7-8. (*Cancelled*).

9. (*Original*) The solid-state image pickup device according to claim 1, wherein a first diffusion layer for device isolation is formed on the semiconductor substrate in said solid-state image pickup region,

a second diffusion layer for device isolation is formed on the semiconductor substrate below the isolating electrode in said peripheral circuit region, and

said first and second diffusion layers are formed in the same step.

10. (*Original*) The solid-state image pickup device according to claim 6, wherein
a first diffusion layer for device isolation is formed on the semiconductor substrate in said
solid-state image pickup region,
a second diffusion layer for device isolation is formed on the semiconductor substrate
below the isolating electrode in said peripheral circuit region, and
said first and second diffusion layers are formed in the same step.

11. (*Original*) The solid-state image pickup device according to claim 1, wherein
a first diffusion layer for isolating a device from another is formed on the semiconductor
substrate in said solid-state image pickup region,
a second diffusion layer for isolating a device from another is formed on the
semiconductor substrate below the isolating electrode in said peripheral circuit region, and
said first and second diffusion layers are formed in different steps.

12. (*Original*) The solid-state image pickup device according to claim 6, wherein
a first diffusion layer for isolating a device from another is formed on the semiconductor
substrate in said solid-state image pickup region,
a second diffusion layer for isolating a device from another is formed on the
semiconductor substrate below the isolating electrode in said peripheral circuit region, and
said first and second diffusion layers are formed in different steps.

13. (*Original*) The solid-state image pickup device according to claim 11, wherein said second diffusion layer is higher in impurity concentration than said first diffusion layer.

14. (*Original*) The solid-state image pickup device according to claim 12, wherein said second diffusion layer is higher in impurity concentration than said first diffusion layer.

15. (*Previously Presented*) The solid-state image pickup device according to claim 11, wherein
said second diffusion layer is formed to be separated into at least two regions on the semiconductor substrate below said isolating electrode, and
at least one of the at least two regions is connected to said isolating electrode.

16. (*Previously Presented*) The solid-state image pickup device according to claim 12, wherein
said second diffusion layer is formed to be separated into at least two regions on the semiconductor substrate below said isolating electrode, and
at least one of the at least two regions is connected to said isolating electrode.

17. (*Previously Presented*) The solid-state image pickup device according to claim 13, wherein

said second diffusion layer is formed to be separated into at least two regions on the semiconductor substrate below said isolating electrode, and

at least one of the at least two regions is connected to said isolating electrode.

18. (*Previously Presented*) The solid-state image pickup device according to claim 14, wherein

said second diffusion layer is formed to be separated into at least two regions on the semiconductor substrate below said isolating electrode, and

at least one of the at least two regions is connected to said isolating electrode.

19. (*Original*) The solid-state image pickup device according to claim 1, wherein said electrically conductive single-layer material film is formed of a polysilicon film.

20. (*Original*) The solid-state image pickup device according to claim 6, wherein said electrically conductive single-layer material film is formed of a polysilicon film.

21. (*Previously Presented*) The solid-state image pickup device according to claim 1,
wherein

said electrically conductive material film is formed of a layered film of a polysilicon film
and a metal silicide film formed on the polysilicon film.

22. (*Previously Presented*) The solid-state image pickup device according to claim 6,
wherein

said electrically conductive material film is formed of a layered film of a polysilicon film
and a metal silicide film formed on the polysilicon film.

23. (*Previously Presented*) The solid-state image pickup device according to claim 5,
wherein

said electrically conductive material film is formed of a metal film.

24. (*Previously Presented*) The solid-state image pickup device according to claim 6,
wherein

said electrically conductive material film is formed of a metal film.

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. APPLN. NO. 09/855,652
ATTORNEY DOCKET NO. Q64500

25. (*Previously Presented*) The solid-state image pickup device according to claim 1,
wherein

a fourth insulating film is buried between electrodes formed of said electrically
conductive material film, and

a surface of the semiconductor substrate comprising said electrodes and said fourth
insulating film is made generally flat.

26. (*Previously Presented*) The solid-state image pickup device according to claim 6,
wherein

a fourth insulating film is buried between electrodes formed of said electrically
conductive material film, and

a surface of the semiconductor substrate comprising said electrodes and said fourth
insulating film is made generally flat.

27. (*Original*) The solid-state image pickup device according to claim 1, wherein a
constant voltage is applied to said isolating electrode.

28. (*Original*) The solid-state image pickup device according to claim 6, wherein a
constant voltage is applied to said isolating electrode.

29 – 40. (*Cancelled*).

41. (*Currently Amended*) A method for fabricating a solid-state image pickup device, comprising the steps of:

forming, in a solid-state image pickup region of a semiconductor substrate, a first diffusion layer for isolating a device from another in said solid-state image pickup region and in a peripheral circuit region other than the solid-state image pickup region of said semiconductor substrate, a second diffusion layer for isolating a device from another in said peripheral circuit region, respectively,

forming, on a surface of the semiconductor substrate of said solid-state image pickup region, a first insulating film and on a surface of the semiconductor substrate of said peripheral circuit region, at least a second insulating film, respectively,

depositing an electrically conductive electrode material film on a surface of the semiconductor substrate including said first and second insulating films,

forming a charge transfer electrode on said first insulating film of said solid-state image pickup region by patterning said electrically conductive electrode material film and an isolating electrode on said second insulating film of said peripheral circuit region, respectively,

wherein the step of patterning said electrically conductive electrode material film is followed by the step of burying a fourth insulating film between electrodes formed of said electrically conductive electrode material film including said charge transfer electrode and said isolating electrode, wherein
~~The method for fabricating a solid-state image pickup device according to claim 38, wherein~~

the step of burying the fourth insulating film between electrodes formed of said electrically conductive electrode material film including said charge transfer electrode and said isolating electrode is performed by

depositing said fourth insulating film made flowing by heat on the surface of said semiconductor,

flattening the surface of said fourth insulating film through heat treatment on said fourth insulating film, and

etching uniformly said fourth insulating film from a surface thereof to bury said fourth insulating film between said electrodes formed of said electrically conductive electrode material film including said charge transfer electrode and said isolating electrode.

42. (*Currently Amended*) A method for fabricating a solid-state image pickup device, comprising the steps of:

forming, in a solid-state image pickup region of a semiconductor substrate, a first diffusion layer for isolating a device from another in said solid-state image pickup region and in a peripheral circuit region other than the solid-state image pickup region of said semiconductor substrate, a second diffusion layer for isolating a device from another in said peripheral circuit region, respectively,

forming, on a surface of the semiconductor substrate of said solid-state image pickup region, a first insulating film and on a surface of the semiconductor substrate of said peripheral circuit region, at least a second insulating film, respectively,

depositing an electrically conductive electrode material film on a surface of the semiconductor substrate including said first and second insulating films,

forming a charge transfer electrode on said first insulating film of said solid-state image pickup region by patterning said electrically conductive electrode material film and an isolating electrode on said second insulating film of said peripheral circuit region, respectively, wherein the step of forming, on the surface of the semiconductor substrate of said solid-state image pickup region, the first insulating film and on the surface of the semiconductor substrate of said peripheral circuit region, at least the second insulating film, respectively, comprises the step of forming, on the surface of the semiconductor substrate of said solid-state image pickup region, the first insulating film and on the surface of the semiconductor substrate of said peripheral circuit region, the first and second insulating films, respectively,

in the step of forming the charge transfer electrode on said first insulating film of said solid-state image pickup region by patterning said electrically conductive electrode material film and the isolating electrode on said second insulating film of said peripheral circuit region, respectively,

a gate electrode formed of said electrically conductive electrode material film of said peripheral circuit region is formed at the same time on said first insulating film of said peripheral circuit region, wherein

the step of patterning said electrically conductive electrode material film is followed by the step of burying a fourth insulating film between electrodes formed of said electrically conductive electrode material film including said charge transfer electrode and said isolating

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. APPLN. NO. 09/855,652
ATTORNEY DOCKET NO. Q64500

~~electrode, wherein~~The method for fabricating a solid-state image pickup device according to
~~claim 39, wherein~~

the step of burying the fourth insulating film between electrodes formed of said electrically conductive electrode material film including said charge transfer electrode and said isolating electrode is performed by

depositing said fourth insulating film made flowing by heat on the surface of said semiconductor,

flattening the surface of said fourth insulating film through heat treatment on said fourth insulating film, and

etching uniformly said fourth insulating film from a surface thereof to bury said fourth insulating film between said electrodes formed of said electrically conductive electrode material film including said charge transfer electrode and said isolating electrode.

43. (*Currently Amended*) A method for fabricating a solid-state image pickup device, comprising the steps of:

forming, in a solid-state image pickup region of a semiconductor substrate, a first diffusion layer for isolating a device from another in said solid-state image pickup region and in a peripheral circuit region other than the solid-state image pickup region of said semiconductor substrate, a second diffusion layer for isolating a device from another in said peripheral circuit region, respectively,

forming, on a surface of the semiconductor substrate of said solid-state image pickup region, a first insulating film and on a surface of the semiconductor substrate of said peripheral circuit region, at least a second insulating film, respectively,

depositing an electrically conductive electrode material film on a surface of the semiconductor substrate including said first and second insulating films,

forming a charge transfer electrode on said first insulating film of said solid-state image pickup region by patterning said electrically conductive electrode material film and an isolating electrode on said second insulating film of said peripheral circuit region, respectively, wherein

the step of forming, on the surface of the semiconductor substrate of said solid-state image pickup region, the first insulating film and on the surface of the semiconductor substrate of said peripheral circuit region, at least the second insulating film, respectively, comprises the step of forming, on the surface of the semiconductor substrate of said solid-state image pickup region, the first insulating film and on the surface of the semiconductor substrate of said peripheral circuit region, the second insulating film and a third insulating film, respectively, and

in the step of forming the charge transfer electrode on said first insulating film of said solid-state image pickup region by patterning said electrically conductive electrode material film and the isolating electrode on said second insulating film of said peripheral circuit region, respectively,

a gate electrode formed of said electrically conductive electrode material film of said peripheral circuit region is formed at the same time on said third insulating film of said peripheral circuit region, wherein

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. APPLN. NO. 09/855,652
ATTORNEY DOCKET NO. Q64500

the step of patterning said electrically conductive electrode material film is followed by
the step of burying a fourth insulating film between electrodes formed of said electrically
conductive electrode material film including said charge transfer electrode and said isolating
electrode~~The method for fabricating a solid state image pickup device according to claim 40,~~
wherein

the step of burying the fourth insulating film between electrodes formed of said
electrically conductive electrode material film including said charge transfer electrode and said
isolating electrode is performed by

depositing said fourth insulating film made flowing by heat on the surface of said
semiconductor,

flattening the surface of said fourth insulating film through heat treatment on said fourth
insulating film, and

etching uniformly said fourth insulating film from a surface thereof to bury said fourth
insulating film between said electrodes formed of said electrically conductive electrode material
film including said charge transfer electrode and said isolating electrode.

44. (*Currently Amended*) A method for fabricating a solid-state image pickup device, comprising the steps of:

forming, in a solid-state image pickup region of a semiconductor substrate, a first diffusion layer for isolating a device from another in said solid-state image pickup region and in a peripheral circuit region other than the solid-state image pickup region of said semiconductor substrate, a second diffusion layer for isolating a device from another in said peripheral circuit region, respectively,

forming, on a surface of the semiconductor substrate of said solid-state image pickup region, a first insulating film and on a surface of the semiconductor substrate of said peripheral circuit region, at least a second insulating film, respectively,

depositing an electrically conductive electrode material film on a surface of the semiconductor substrate including said first and second insulating films, and

forming a charge transfer electrode on said first insulating film of said solid-state image pickup region by patterning said electrically conductive electrode material film and an isolating electrode on said second insulating film of said peripheral circuit region, respectively~~The method for fabricating a solid-state image pickup device according to claim 29,~~

wherein the second insulating film is formed thicker than the first insulating film, and
wherein the solid-state image pickup region has only the first insulating film provided thereon.

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. APPLN. NO. 09/855,652
ATTORNEY DOCKET NO. Q64500

45. (*Previously Presented*) The method for fabricating a solid-state image pickup device according to claim 44, further comprising:

forming a third insulating film thinner than said the first insulating film on the surface of the semiconductor substrate in the peripheral circuit region.

46. (*Cancelled*).